GIS Naming Conventions

Last revision: August 3, 2005
Effective date: August 3, 2005

Purpose

This document describes guidelines for naming of GIS-related folders, files, attribute tables, and fields for the North Coast and Cascades Network (NCCN) and helps to fulfill the requirements for GIS deliverables developed as part of Inventory and Monitoring (I&M) Program natural resource studies.

The primary objective of this document is to improve GIS data quality and usability by establishing a consistent file naming convention for working and final shared, geo-referenced data sets within the NCCN. These guidelines propose clear filename creation methods in order to minimize confusion, errors, and unnecessary support when GIS data are exchanged among users. Two competing objectives need to be balanced: to make a dataset name easily understood and as short as possible for use in various software systems. Longer field names, sometimes resulting from long dataset names and sometimes created by users, are often truncated during data exchange or format conversion, which could unintentionally create non-unique field names.

These guidelines will:

- promote consistency in GIS layer and attribute (variable or field) naming
- provide guidance to data stewards and data contributors
- advance a clearer understanding of the information in the files, tables and fields via appropriate names
- facilitate the identification of GIS data sets between data users, and facilitate links between spatial and non-spatial databases

Scope and Applicability

These guidelines apply to all NCCN staff, contractors and cooperators responsible for generating and submitting data for permanent retention. Compliance with these guidelines is required for all I&M project data sets (including geospatial databases), and for other projects as stipulated by project study plans, cooperative agreements, contracts or research permits. Specifically, all data that will be maintained in one of the NCCN Digital Libraries, or submitted to any of the NPS national databases/clearinghouses will be subject to these guidelines. Beyond these requirements, it is hoped that these guidelines will be adopted by others as a way to increase operational efficiency and compatibility among data sets. NCCN staff and cooperators creating and/or submitting GIS-related data should work closely with NCCN GIS staff throughout all stages of project development and implementation, and should refer to guidance in this document and those listed in section 4.

Note: NCCN uses ESRI® GIS products, such as ArcView® 3.x, ArcInfo® Workstation, and ArcGIS®. These guidelines are designed to be used with ESRI shapefiles and ArcInfo coverages. ESRI Geodatabases are not supported or recommended by NCCN at this time.

Definitions and Acronyms

Attribute Table	A tabular file containing rows and columns. Attribute tables are normally associated with a class of geographic features. Each row represents a geographic feature. Each column represents one attribute of a feature.

	Feature attribute table support for coverages includes: _.pat for polygon or points, _.aat for area, _.nat for nodes, _.rat for routes, _.sec for section, _.pat for regions, _.tat for annotation (text), where _ is the coverage name. These are collectively called "info" tables, because they reside in the "info" directory of a coverage. Feature attribute table support for shapefiles is restricted to _.dbf.
Coverage	The ESRI ArcInfo native data model (prior to version 8.x). A coverage consists of two directories: one with the coverage name that contains spatial files, and another "info" directory that contains tabular attribute information.
Database	A collection of data organized according to a conceptual structure describing the characteristics of the data and the relationships among their corresponding entities. For example, a GIS database includes data about the position and characteristics of geographical features.
dBase	First widely used database management system for microcomputers by Ashton Tate Corporation. The dBASE format for storing data has become a de facto standard, and is supported by nearly all database management and spreadsheet systems. Even systems that do not use the dBASE format internally are able to import and export data in dBASE format.
ESRI	Environmental Systems Research Institute, Inc. of Redlands, CA. Makers of ArcView, ArcInfo and ArcGIS software.
GIS	A Geographic Information System (GIS) is a computer system for capturing, storing, checking, integrating, manipulating, analyzing, and displaying data related to positions on the Earth's surface.
I&M	Inventory & Monitoring Program of the National Park Service
Lookup Table	A special table that provides a list of values that you can choose from when you are entering data. This makes data entry easier and ensures the consistency of the data in that field.
NPS	National Park Service
NCCN	North Coast and Cascades Network http://www1.nature.nps.gov/im/units/nccn
Primary Key	A unique identifier for each record in a relational table. It can either be a user-defined attribute that is guaranteed to be unique or it can be generated by a database management system, such as the globally unique identifier (GUID) created in Microsoft® SQL. Primary keys may consist of a single attribute or multiple attributes in combination.
Shapefile	The ESRI ArcView 3.x native data model. Shapefiles store non-topological geometry and attribute information for the spatial features in a data set. The geometry for a feature is stored as a shape comprising a set of vector coordinates. Shapefiles can support point, line and area features and consist of at least three files: _.shx, _.shp, _.dbf, where _ is a file name. Additionally, a projection file (_.prj) and a metadata file (_.shp.xml) are recommended.
Special Character	A character not in the standard 7-bit ASCII character set, such as the copyright mark (©) or the ampersand (&).

Procedures and General Requirements

1. General requirements
    A. Do not use spaces.
    B. Do not use special characters.

C. Use only letters, numbers, and underscores (to separate words within a single name).

2. Folder names
   A. Limit name to 20 characters.
   B. Use clear and meaningful names that convey the subject of the data.
   C. Use upper case for the first letter and lowercase for the rest of the name.

3. File and attribute table names
   A. GIS Final Products – Coverages, shapefiles and other formats must conform to a 10.3 file naming structure (that is, cxxxxxxxxx.ext, where "c" is an alpha character and "x" is alphanumeric, for a total of 13 characters and one period separating the filename from the extension). The following conventions should be used to generate file names: ccccccc99c.ext
      i. A 4-character prefix for park code (see Table 1).
      ii. A 5-character project code, as indicated in the NCCN project tracking database. Refer to NCCN Tracking Project Information (NCCN 2005b, in development).
      iii. A single character differentiating GIS layers within the same project. This single character is referred to as the GIS project product code and is maintained in the NCCN project tracking database. This should be an alpha character selected in sequence (i.e., start with a, b, c, etc.) as more GIS layers are created for or are added to the project. For example, assuming that there already exist two other GIS layers for this project, an ESRI Arc/Info export file of the NOCA Landbird Inventory project transect starting points would have a file name of "nocabda02c.e00."
      iv. The extension. An ESRI shapefile would consist of a minimum of five files with the same name and the following extensions: .shp, .shx, .dbf, .shp, shp.xml, and .prj.

Table 1: North Coast and Cascade Network Park Codes for I&M GIS data:

Park Name	Park Code
Ebey's Landing National Historical Reserve	EBLA
Fort Vancouver National Historic Site	FOVA
Klondike Gold Rush National Historical Park-Seattle Unit	KLSE
Lewis and Clark National Historical Park	LEWI
Mount Rainier National Park	MORA
North Cascades National Park Service Complex	NOCA
Olympic National Park	OLYM
San Juan Island National Historical Park	SAJH

   B. GIS Working Files – Coverages, shapefiles and other formats must conform to a 10.3 file naming structure (that is, cxxxxxxxxx.ext, where "c" is an alpha character and "x" is alphanumeric, for a total of 13 characters and one period separating the filename from the extension). The following conventions should be used to generate file names: cxxxxxxxc9.ext
      i. A single alpha character prefix for park code (see Table 2). Files containing data for the entire North Coast and Cascades Network would have an "a" prefix.

Table 2: North Coast and Cascade Network Park Codes for non-I&M GIS data.

Park Name	Park Code
Ebey's Landing National Historical Reserve	e
Fort Vancouver National Historic Site	f
Klondike Gold Rush National Historical Park-Seattle Unit	k
Lewis and Clark National Historical Park	l

Mount Rainier National Park	m
North Cascades National Park Service Complex	n
Olympic National Park	o
San Juan Island National Historical Park	s
North Coast and Cascades Network	a

ii. A 7-character alphanumeric subject name. If possible, use common abbreviations used in the NCCN (see Appendix 1). Abbreviations can be combined with an underscore to make the file names more descriptive. For example, a carnivore density shapefile or coverage might have a name of "crn_dns."

iii. A single alpha character to differentiate point (p), line (l), polygon (g) or raster (r) GIS layer.

iv. A single numeric character representing file version. Lower numbers represent earlier versions of the file. An example: ncrn_dnsp1.shp. When the 9th version of the file has been reached, previous versions of the file should be archived and archival year in the form of "99" should be added to the version number. For example: ncrn_dnsp105.shp. The version number of the latest working version of the file would then be renumbered to "1."

v. The extension. An ESRI shapefile would consist of a minimum of five files with the same name and the following extensions: .shp, .shx, .dbf, .shp.xml, and .prj.

4. Field names
   A. Refer to NCCN Database Template (NCCN 2005a, in development) for all I&M required standard field names and formats.
   B. For non-required field names, limit names to 10 characters or less to conform to dBase and ArcInfo naming limitations (Cxxxxxxxxx, where "C" is an alpha character and "x" is alphanumeric).
   C. Use clear and meaningful names that convey the subject of the data.
   D. Use uppercase for the first letter and lowercase for the rest of the name.
   E. Always include measurement units in a field name, and abbreviate where appropriate. For example, use "Elev_m," instead of "Elevation."
   F. If abbreviation is necessary, use common abbreviations. For the list of abbreviations commonly used in NCCN see Appendix 1. For international abbreviations used in GIS see the following websites: Oregon Department of Forestry GIS acronyms (Oregon Department of Forestry GIS 2004), Dictionary of Abbreviations and Acronyms in Geographic Information Systems, Cartography, and Remote Sensing (Hoehn et al. 2004), and GIS Dictionary – List of Acronyms (AGI 2005).
   G. Normalize fields at least to first normal form, i.e. use only one item of data for each field. Item selection should be driven by how the data will be displayed, queried, and analyzed. Data entry, validation, and retrieval are easier when each cell in every field contains a single, independent item. For example, use four fields (Street, City, State, and Zip_code) instead of one to contain information on a person's address. For more information on database design, see NPS Recommended Database Strategies (Southwould 2002). For more information on database normalization see Relational Database Normalization Process (Microsoft Access Database Solutions 2003-2005).
   H. Use the suffix '_ID' for primary keys. For example, Site_ID, Plot_ID, or Station_ID. Use the same field name for foreign keys, i.e. Site_ID will relate to Site_ID in another table.
   I. Make nouns singular. For example, use Life_stage rather than Life_stages.
   J. Avoid a field name that is a word reserved for use by a database server or GIS software program. In some cases, it may be sufficient to suffix an underscore to the reserved word (for

example, Year_). For a list of reserved words refer to "Reserved Words" section of the Recommended Naming Standards for Inventory and Monitoring Databases (Washington Support Office 2004).

5. Field values
    A. Whenever possible, use lookup tables to populate field values. Refer to NCCN Database Template (NCCN 2005a, in development) for further information.
    B. Use consistent case (Title Case or lowercase recommended).
    C. Use consistent names for field values when referring to the same entity. For example, Diobsud Creek and Diobsud Cr. refer to the same stream, and one name should be used for both field entries.

Responsibilities

- Project leads, data managers, cooperators, and contractors working on NCCN I&M projects are responsible for consulting with NCCN GIS specialists in advance of GIS data development.
- NCCN GIS specialists are responsible for providing support to all parties requesting information on I&M GIS data development within the network.
- NCCN GIS specialists will verify that all submitted GIS layers adhere to the format outlined in this document.

Credits

- Sections adapted from: Oregon GIS Program Leaders (GPL). 2004. GIS Layer and Attribution Naming White Paper. Document Number 2004-01. Available at: http://www.gis.state.or.us/coord/gpl/GIS_Naming_WhitePaper.pdf
- Common GIS file abbreviations were adapted in part from the following NPS programs: Geologic Resource Evaluation Program available at http://www2.nature.nps.gov/geology/inventory/, Tallgrass Prairie National Preserve GIS, and Base Cartography Inventory available at http://science.nature.nps.gov/im/inventory/basecarto/index.htm.

Recommended Citation

North Coast and Cascades Network – National Park Service. 2005. GIS Naming Conventions. USDI National Park Service.

Contact Information

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Ebey's Landing National Historical Reserve	Please refer to contacts for North Cascades NP
Fort Vancouver National Historic Site	Please refer to contacts for Mount Rainier NP
Lewis and Clark National Historical Park	Please refer to contacts for Mount Rainier NP
San Juan Island National Historical Park	Please refer to contacts for North Cascades NP

Reference Documents

Related Guidance

- Boetsch, J.R., B. Christoe, and R.E. Holmes. 2004. Draft data management plan for the North Coast and Cascades Network Inventory and Monitoring Program. USDI National Park Service. Port Angeles, WA.

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Other Citations and References

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Revision History

Revision Date	Description of Change	Author	Effective Date
Mmm dd, yyyy		Full name	Mmm dd, yyyy

Appendix 1. NCCN Common GIS Abbreviations

Code	Description
amp	Amphibians
ap	Aerial photographs
aq	Aquatic
asp	Aspect
bat	Bats
bc	British Columbia
bdr	Bedrock
bld	Buildings
blk	Blocks
bmi	Benthic Macroinvertebrates
bnd	Administrative boundaries
bop	Bird observation points
br	Bears
brd	Borders
brg	Bridges
brt	Bird transects
buf	Buffer
clf	Cultural features
clm	Climate
clp	Clipped
cls	Cultural sites
clv	Culverts
cmp	Camps
cnd	Canada
cnt	Contours
crn	Carnivores
crw	Crown
ctch	Catchments
dcw	Digital Chart of the World
deg	Degrees
dem	Digital Elevation Model in meters
dlg	Digital Line Graphic
dmp	Dump
dns	Density
doq	Digital Orthophoto Quads
doqq	Digital Orthophoto Quarter Quads
drg	Digital raster graphics
egl	Eagles
elv	Elevation
epl	Exotic plants
fire	Fire
fld	Floodplains from HUD maps
fma	Fire Management Areas
fsh	Fish
fsr	Fishers

Code	Description
gag	Water gages
gap	Gap Analysis Program
geo	Significant geologic features
glc	Glaciers
grv	Gravel pits
grz	Grizzly Bears
gt	Goats
hlp	Helipads
hps	Hypsography (contours)
hsh	Hillshade
hst	Historic
hu	Hydrologic Units
hyd	Surface hydrology
ice	Ice
imp	Impacts
ins	Insects
int	International
inv	Invertebrates
ivmp	Interagency Vegetation Mapping Project
lc	Land cover
lk	Lake
lmk	Landmarks
lnd	Landforms
lnx	Lynx
log	Logging
lsv	Located survey markers
lu	Land use
lw	Lower
mm	Mammals
mn	Mines
nfdr	National Fire Danger Rating System
nffl	National Forest Fire Laboratory Fuel Model
nps	National Park Service
or	State of Oregon
own	Ownership
pcp	Precipitation
pct	Percent
PCT	Pacific Crest Trail
pk	Peaks
pl	Pools
plss	Public land survey system
pmr	Pacific Meridian Resources
pnd	Ponds
pll	Pollution
ppl	Pipes and Transmission Lines

Code	Description
prv	Private
pst	Pastures
qd	Quads
qr	Quarries
rd	Roads
riv	Rivers
rml	River Miles
rna	Resource Natural Areas
ros	Rain-on-snow zones
rpl	Rare plants
rpr	Riparian
rpt	Repeaters
rrd	Railroads
rst	Ranger Stations
rw	Right-of-way
scl	Seattle City Light
sgn	Signage
slp	Slope
smp	Sampling
snw	Snow
soil	Soils
spr	Springs
spw	Spotted Owls
sshp	Salmon and Steelhead Habitat Inventory Assessment Program
stc	Structures
ste	Stehekin
str	Stream
strl	Social Trails
swp	Swamp
tln	Treeline
tm	Landsat Thematic Mapper (TM) images
trb	Tributaries
trh	Trailheads
trl	Trails
trn	Transportation
trsh	Trashcans
up	Upper
us	United States of America
usfs	United States Forest Service
utl	Utilities
veg	Vegetation
vsp	Vegetation sample plots
vu	Visitor use
wa	Washington State
wbp	Whitebark Pine
wch	Water chemistry
wld	Wilderness

Code	Description
wlf	Wildlife
wlr	Wolverines
wlv	Wolves
wq	Water quality
dot	Department of Transportation
wsh	Watersheds
wtl	Wetlands
zn	Zones